

# A questionnaire survey on postoperative intermaxillary fixation in mandibular trauma: Is its use based on evidence?

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## ABSTRACT

**Context:** This questionnaire survey was conducted to ascertain if the practice of the routine use of postoperative intermaxillary fixation (IMF) in mandibular trauma (of the dentate segments only) was based on evidence available in the literature. **Settings and Design:** This study was designed as a questionnaire survey that would be conducted among surgeons operating on mandibular fractures in the state of Gujarat. **Materials and Methods:** A typed questionnaire was sent to oral maxillofacial surgeons and plastic surgeons of Gujarat state for their feedback by post. Approval of the ethical committee of the university was obtained. All the feedback forms received back were included for this survey which included 25 oral and maxillofacial surgeons and 25 plastic surgeons. **Results:** Although majority of the surgeons use open reduction and internal fixation (ORIF), 25% of the surgeons still prefer using only IMF as the sole modality of treatment for the said group of mandibular fractures. According to our survey, the majority of surgeons use IMF routinely in the postoperative setting even after using ORIF. Occlusion seems to be the critical factor among 72% of surgeons in deciding on the use of IMF as an adjunct after ORIF. Seventy-eight percent of surgeons vary their period of IMF based on the site of fracture. **Conclusion:** The routine use of postoperative IMF in cases of mandibular fractures seems to find favor among surgeons despite lack of sound scientific evidence supporting its use. There is also no evidence to suggest that if IMF is not used, it would have deleterious effects on occlusion or otherwise.

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**Key words:** Immediate mobilization, mandibular trauma, postoperative intermaxillary fixation

## INTRODUCTION

Mandibular fractures are one of the most frequent traumatic injuries treated by oral and maxillofacial surgeons. The important factors in the management of any fracture are reduction and stabilization of the fracture which should be accomplished by the

simplest means possible, to achieve optimal results. The treatment of fractures of the jaw has a long history, starting from ancient Egypt to the present.<sup>[1]</sup> The application of intermaxillary fixation (IMF) to the maxillofacial skeleton has a key role in the management of trauma in this region. The treatment of facial fractures has traditionally involved re-establishment of a functional dental occlusion with various types of IMF.

IMF has been used as the sole modality of treatment in the management of mandibular fractures.<sup>[1]</sup> The disadvantage of using IMF alone as a treatment modality is that anatomical reduction is not always possible. IMF is also used before and during open reduction and internal fixation (ORIF) of fractures to

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confer temporary stability to the fracture site. Finally, some surgeons prefer using IMF after ORIF to provide additional immobility across the fracture site during the healing period, despite the fact that literature does not support such use.

With the advent of internal fixation techniques, surgeons got the opportunity to re-establish the patient's normal occlusion and obtain anatomical bony reduction. Although rigid internal fixation with compression plates was used initially, the use of miniplates was eventually found to have several advantages.<sup>[2]</sup> Recently, wire-free fixation of fractures seems to be finding favor among surgeons.<sup>[3]</sup> Wiring of the jaws is time-consuming, a second procedure is needed to remove it, and needle-stick injuries occur during placement. Therefore, the use of wires and IMF is on the wane. Studies have proven that IMF is not a prerequisite for performing ORIF of mandibular fractures.<sup>[4-6]</sup> Research has also shown that IMF is not always necessary after ORIF for satisfactory healing.<sup>[7,8]</sup> In the 21st century, the total abolition of IMF in the treatment of mandibular fractures is the next major goal of maxillofacial trauma management.

But still, IMF continues to be used by a lot of surgeons in the preoperative and postoperative period (after ORIF). The routine use of postoperative IMF (being followed by some surgeons) after ORIF is questionable because internal fixation provides sufficient rigidity to allow adequate healing of the fracture.

Hence, we decided to have a questionnaire survey among the oral and maxillofacial surgeons and plastic surgeons within the state of Gujarat who treat mandibular fractures to know their trends related to the use of postoperative IMF.

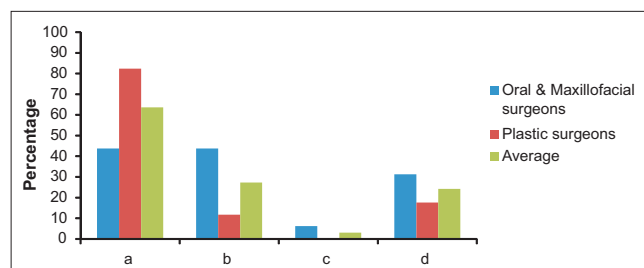
## MATERIALS AND METHODS

This study was designed as a questionnaire survey among oral and maxillofacial surgeons and plastic surgeons of various parts of Gujarat state. Validation of the questionnaire was done and approval was obtained from the ethical committee. The questionnaire form was sent to the surgeons by post. All surgeons were asked to return the completed survey forms within 30 days. All surgeons were further contacted over the telephone also and the purpose was explained to them. It was clearly stated that all questions were related solely to the use of IMF in fractures of the dentate mandible in the postoperative period. Surgeons not willing to participate in the survey and those who did not return the forms within the stipulated time period were not included in the study.

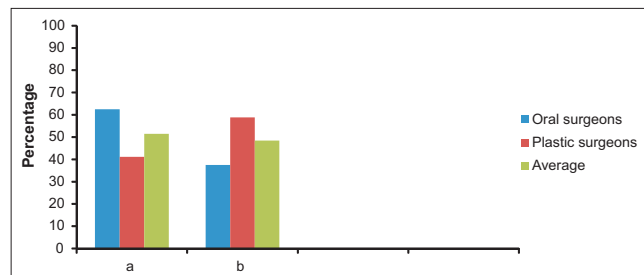
## RESULTS

The questionnaire survey was sent to a total of 29 oral and maxillofacial surgeons and 27 plastic surgeons of Gujarat. Out of them 25 oral and maxillofacial surgeons and 25 plastic surgeons mailed back their response.

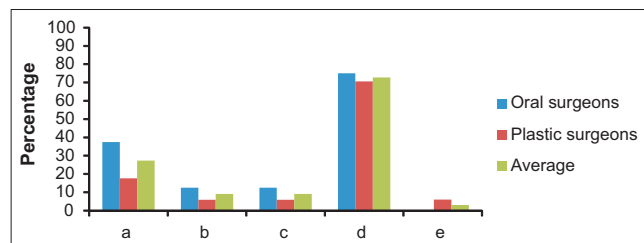
Although the majority of the surgeons use ORIF, 25% of the surgeons still prefer using only IMF as the sole modality of treatment for the said group of mandibular fractures [Figure 1] and despite using ORIF, the majority of surgeons (51.51%) use IMF routinely in the postoperative period [Figure 2]. Occlusion seems to be the critical factor among 72% of surgeons in deciding on the use of IMF as an adjunct after ORIF [Figure 3]. Forty-two percent use IMF for a week but over 20% use it for four weeks or more [Figure 4]. This despite the fact that the majority of surgeons (63.63%) prefer rigid or semi-rigid internal fixation.



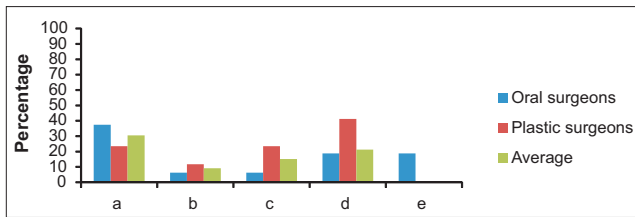
**Figure 1:** What is your preferred modality of treatment for mandibular fracture? a) rigid osteosynthesis, b) semi-rigid osteosynthesis, c) transosseus wiring, d) intermaxillary fixation only



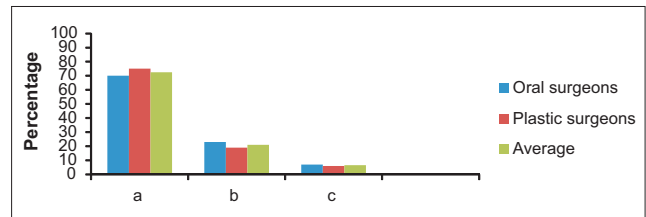
**Figure 2:** Do you routinely use postoperative intermaxillary fixation (IMF) in all cases of mandibular fractures? a) yes, b) no



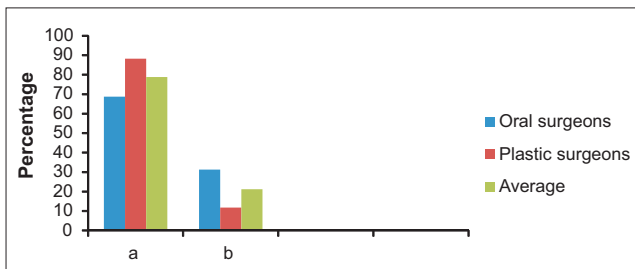
**Figure 3:** What criteria do you choose to select postoperative intermaxillary fixation as an adjunctive modality of treatment in mandibular fracture? a) displacement of fracture, b) medical condition of the patient, c) age of the patient, d) occlusion, e) any other



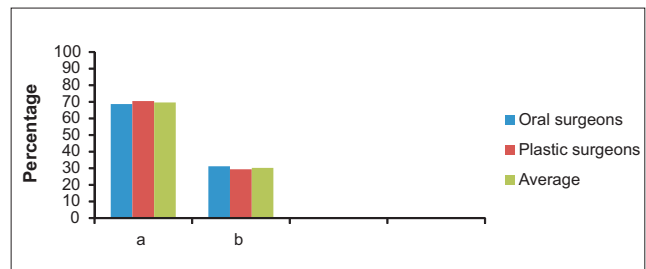
**Figure 4:** How long do you advise intermaxillary fixation to be kept postoperatively? a) 1 week, b) 2 weeks, c) 3 weeks, d) 4 weeks, e) more than 4 weeks



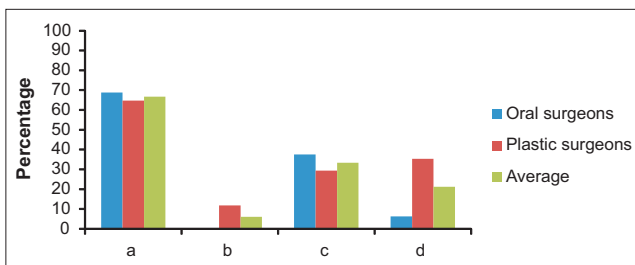
**Figure 5:** What criteria do you employ to decide about the period of postoperative intermaxillary fixation? a) occlusion, b) fracture fragment mobility, c) others



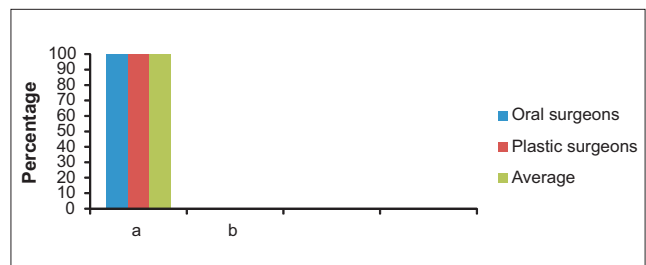
**Figure 6:** Does your period of postoperative intermaxillary fixation vary according to site of fracture? a) yes, b) no



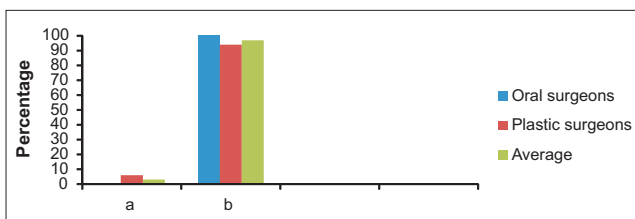
**Figure 7:** Do you think that use of postoperative intermaxillary fixation on a routine basis gives more favorable occlusion? a) yes, b) no



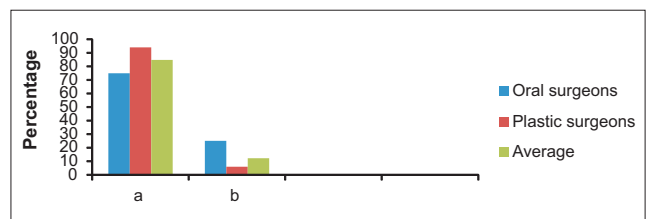
**Figure 8:** What modality do you use most often for intermaxillary fixation? a) wiring, b) screws, c) guiding elastics, d) any other



**Figure 9:** While performing intermaxillary fixation using wires have you encountered glove perforation or prick injuries? a) yes, b) no



**Figure 10:** Have you ever come across a case of allergy to metal caused by materials used for intermaxillary fixation? a) yes, b) no



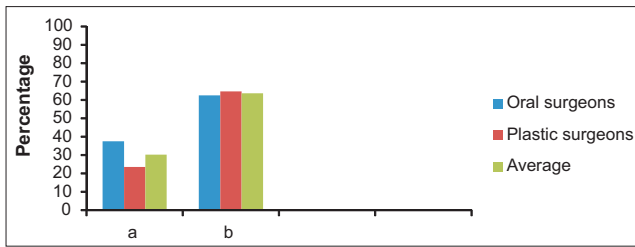
**Figure 11:** Do your patients experience weight loss after a period of postoperative intermaxillary fixation? a) yes, b) no

Occlusion again seems to be the key factor in deciding on the period of IMF after ORIF [Figure 5]. Seventy-eight percent of surgeons vary their period of IMF based on the site of fracture [Figure 6]. When asked if routine postoperative IMF gave more favorable occlusion, a large majority, i.e. about 70% of surgeons answered in the affirmative [Figure 7]. Wiring is the most preferred mode of IMF [Figure 8] and predictably all surgeons have experienced injuries while doing the procedure [Figure 9].

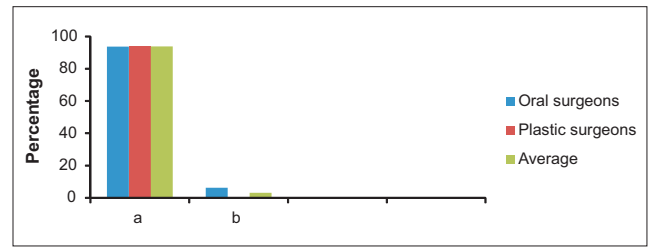
Only a negligible portion of surgeons came across an allergy to metal [Figure 10] but around 84% of them

said that their patients experienced weight loss after a period of IMF, even after having used it for one week [Figure 11]. Although literature shows proof of pulmonary function being affected by IMF, most of the surgeons surveyed seemed to think it did not affect the same [Figure 12].

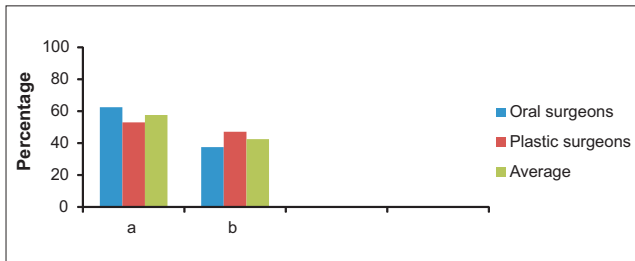
An overwhelming majority (93.93%) of surgeons agreed that IMF was stressful to the patient [Figure 13] while a sizeable number (42.42%) of them found it difficult to convince the patient for a period of IMF [Figure 14]. The oral hygiene status was said to be fair among patients under IMF by 82% of the participants [Figure 15].



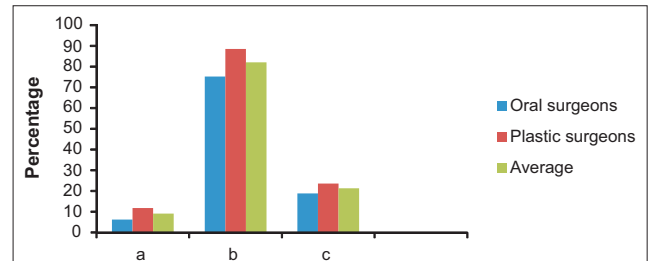
**Figure 12:** Do you think that intermaxillary fixation has any effect on pulmonary function? a) yes, b) no



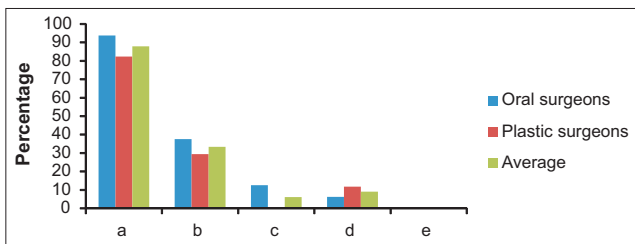
**Figure 13:** Do you think that the postoperative period of intermaxillary fixation is stressful to the patient? a) yes, b) no



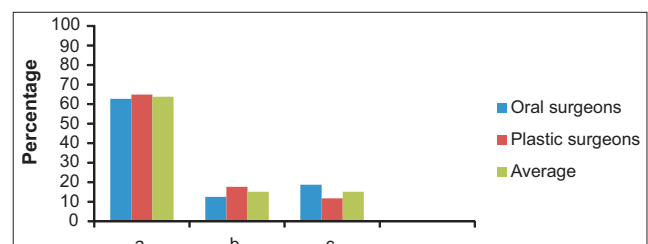
**Figure 14:** Do your patients easily agree to be kept under postoperative intermaxillary fixation? a) yes, b) no



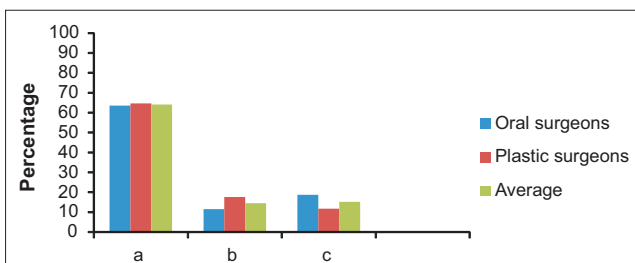
**Figure 15:** What is the oral hygiene status of the patient when you have given IMF? a) good, b) fair, c) poor



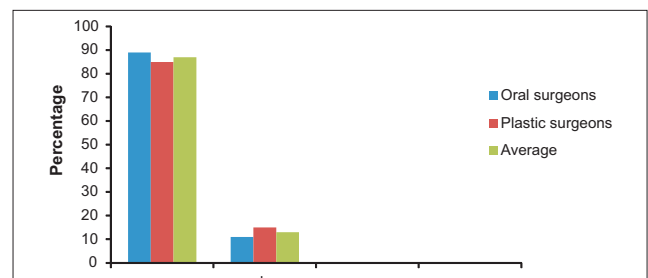
**Figure 16:** On what basis do you decide to open the IMF? a) occlusion, b) fracture fragment mobility, c) radiological evaluation, d) poor patient compliance, e) any other



**Figure 17:** What is your follow-up schedule for the patient when you have given postoperative IMF? a) every week, b) fortnight, c) any other



**Figure 18:** On an average how many isolated dentate mandibular fracture cases do you treat in the span of one year? (approximately) a) less than 10, b) 10 - 30, c) more than 30



**Figure 19:** Did any of your patients with IMF experience temporomandibular joint discomforts or problems after release of IMF? (approximately) a) none-87%, b) yes-13%

Occlusion was again the key factor for more than 88% of the surgeons for deciding on the release of IMF [Figure 16].

Weekly follow-up after IMF seemed to be the norm for most surgeons [Figure 17]. Almost 64% of surgeons treat approximately less than 10 cases of isolated dentate mandibular fracture in the span of one year [Figure 18]. Temporomandibular joint (TMJ) discomfort was not found to be a significant problem among most of the surgeons surveyed [Figure 19].

## DISCUSSION

Rigid internal fixation has several limitations and complications.<sup>[9]</sup> These limitations led to the advent of the miniplate system which were easier to apply and gave equally good results.<sup>[10]</sup>

The ideal treatment paradigm for mandible fractures would encompass the latest breakthroughs in advanced biomaterials, maintain stability at the fracture site, demonstrate ease of application,

and permit immediate function with release from intraoperative IMF (if used).

In an effort to move closer to that goal, clinicians have been attempting to obviate the period of IMF, while not adversely affecting rates of nonunion and infection. Patients having IMF for long periods may manifest more dramatic problems and differences than those who have immediate mobilization. The benefits of immediate function following ORIF seem to be multiple such as good nutrition, lesser chance of complication, better healing through micromovements, good speech, etc.

IMF can lead to osteoporosis, hypercapnia, hypoxia and decreased Ph in the nutrient veins of immobilized bones.<sup>[11]</sup> These changes are reversible to varying degrees, depending on when function is reinstituted. Only one case has been reported regarding allergy to material used for IMF.<sup>[12]</sup> Animal studies suggest that IMF can lead to atrophy, weakness, and decrease in the cross-sectional areas of the masseter and temporalis muscle fibers after five weeks of IMF.<sup>[13]</sup> IMF can initiate condylar changes in the TMJ if instituted for longer duration.<sup>[14]</sup>

According to our survey, a sizeable number of oral surgeons still seem to be using only IMF for treating mandibular fractures of the dentate segments despite it being an obsolete method with the advancements in instrumentation and armamentarium. The majority of oral surgeons seemed to be using postoperative IMF on a routine basis (51.51%). The scientific basis for such a practice is questionable. The whole premise of using ORIF is to eliminate the need for postoperative IMF and to establish immediate function.

The majority of the surgeons in this survey believed occlusion to be the guide for using postoperative IMF. Occlusion was the factor relied on by most surgeons to decide the period of postoperative IMF. Most (70%) surgeons believed that routine postoperative IMF after internal fixation gives more favorable occlusion despite the fact that there are no studies to confirm a definitive advantage with routine postoperative IMF when compared to immediate function. The only key advantage of using IMF is neuromuscular adaptability. Stabilizing occlusion with a routine period of IMF after ORIF does not seem to be scientifically validated. To the best of our knowledge, there does not seem to be any scientific study in literature that supports the use of postoperative IMF on a routine basis after ORIF. On the contrary, Kaplan *et al.*,<sup>[7]</sup> and Pedersen *et al.*,<sup>[8]</sup> in their respective studies have reported that immediate mobilization after ORIF in patients showed similar results when compared to patients in whom IMF was used after performing ORIF.

A majority of surgeons said that their period of IMF varies according to the site of fracture. Considering that the scenario was limited to the dentate portion of the mandible, the practice of having variable periods of IMF for different regions seems questionable. Wiring was the most preferred mode of placing the patient on IMF. The inherent drawbacks of this are injuries to the operating surgeon and patient, and risk of cross-infection while being a cumbersome and time-consuming procedure. Therefore, avoiding the use of IMF seems to be beneficial in every sense. Other unwanted effects of IMF were also endorsed by the surgeons. Weight loss was noted despite a period of one week of IMF. Most surgeons agreed that the procedure of IMF was stressful to their patients. A weekly follow-up schedule meant increased visits to the hospital and prolonged duration of treatment. Although literature shows IMF to have deleterious effects on the TMJ and pulmonary function,<sup>[15]</sup> the surveyed surgeons did not seem to think so. This could be attributed to lack of awareness among them.

Internal fixation of fracture fragments using plates and screws, if properly done, leads to rigid immobilization of fracture fragments, logically resulting in abolition of the routine use of postoperative IMF. This has dual benefit i.e. it avoids the deleterious and unwanted effects of a prolonged period of IMF and also returns the patient to normal function earlier and thereby reduces the period of postoperative morbidity. Despite such obvious benefits, the routine use of postoperative IMF continues to find favor among the majority of surgeons.

Several scientific studies have opined that IMF is not necessary while performing internal fixation.<sup>[4-6]</sup> By avoiding the use of perioperative IMF, the surgeon increases operative efficiency through economy of time and cost, increases operative safety, and increases postoperative comfort for the patient, all without any detrimental effect to the final treatment outcome. So, if IMF is not used routinely in the postoperative period, wiring can totally be avoided in majority of the patients thereby saving time and effort for the surgeon and more importantly avoiding stress to the patient. The need of the hour is evidence-based practice that allows the surgeon to pass on more benefits to the patient rather than sticking on to age-old practices that do not have a sound scientific rationale.

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